shape and lipid contens of atheroma. The aim of our study was to characterize atherosclerotic lesions ex vivo using a 0.5 T magnet, to delineate plaque components and to compare MR results with intravascular ultrasound (IVUS) and histology. 30 necropsy specimens of human iliac arteries were studied. Intravascular imaging was performed with a 4.3 F 30-MHz ultrasound transducer and magnetic resonance imaging studies were carried out on a 0.5-Tesla superconducting magnet using a 5 cm surface coil. Vessels were placed in an upright position in the center of the surface coil. MR imaging was obtained in a coronal plane (4–5 slices). The slice position was oriented by an external marker. The matrix size was 256 × 256 with 4 NEX and a FOV of 45 mm. T1 (SE 520/29) and T2 pulse sequences (SE 2200/28 and SE 2200/90) were obtained. On T1 weighted images the signal intensity (SI) of fibrous plaques was 28.3 ± 3.8 and increased significantly on SE 2200/28 to 49.1 ± 8.2 ($p \leq 0.0001$) and decreased to 24.1 ± 6.8 ($p \leq 0.0001$) at SE 2200/90. However, lipid containing plaques did not show significant changes in SI between T1 (28.2 ± 5.4) and T2 weighted images (25.5 ± 5.9) Only at SE 2200/90, SI of lipid plaques decreased significantly (11.8 ± 3.9, $p \leq 0.0001$). As compared to histology, MR has shown a high sensitivity and specificity number in the detection of fibrous and lipid plaque components. Intravascular ultrasound, however, was less sensitive in detection and differentiation of fibrous and lipid plaques but was superior in the visualization of the three-layer appearance of the vessel wall especially in atherosclerotic vessels.

1023-109 A New Animal Model for Remodelling Followed Up With Magnetic Resonance Imaging

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Remodelling is thought to be an important component of restenosis. A relevant animal model to study the pathophysiology of remodelling and potential therapeutic strategies is needed. Magnetic resonance imaging (MRI) provides a method of visualising arterial dimensions in vivo. In this study we have investigated the effect of injury in an animal model using both MRI in vivo and morphometry measurements after sacrifice.

Abdominal aortae of Sprague-Dawley rats (n = 31) were balloon-injured. Two, 4 and 6 weeks after injury, rats were scanned with an 1.5 T MRI scanner. Normal rats were used as control animals (n = 10). Longitudinal pictures of aorta dimensions were analysed using computer-assisted techniques. Rats were immediately sacrificed and aortae processed for histology. Computer-assisted morphometry was used to measure luminal and arterial wall areas and results were compared with both techniques. In normal rats, mean aortic area at histology was 0.56 ± 0.12 mm^2 (SEM); area within the external elastic lamina (EEL) was 0.65 ± 0.11 mm^2. With longer time points after balloon injury, both areas increased to a maximum of 1.36 ± 0.36 mm^2 and 1.76 ± 0.35 mm^2. These results were correlated with MRI values ($r^2 = 0.86$; $p = 0.0001$). Differences between normal and balloon injured arteries were significant by both techniques ($p < 0.05$ in both).

In conclusion, the rat aorta angioplasty model results in expansion of the lumen after angioplasty and this could be a possible model for the remodelling process. MRI in viva confirmed the results obtained by histology of tissue sections. Magnetic resonance imaging can therefore be used to follow-up luminal dimensions over time without sacrificing animals, even in small animals such as rats.

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Tuesday, March 18, 1997, 3:00 p.m.–5:00 p.m.
Anaheim Convention Center, Hall E
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1024-116 Spontaneous Contrast (SC), Hypercoagulability and Surgical Trauma

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Although SC is commonly associated with low blood flow, other conditions, such as surgical trauma, also produce SC. The purpose of this study is to determine if SC resulting from surgical trauma also is associated with a hypercoagulable state. Seven mongrel dogs were sedated with innovar-vet, anesthetized with pentobarbital, intubated and ventilated with room air. Control blood samples were obtained and ultrasonic exams of the femoral artery and vein with a 10 MHz transducer were obtained. A laparotomy was performed and repeat blood samples and ultrasonic exams of the femoral artery and vein and the inferior vena cava and the aorta were obtained. These tests were repeated 2 hours after the laparotomy. The amount of SC was quantitated by computerized image analysis. The results showed that the hematocrit increased after the laparotomy (37 to 41%, $p = 0.04$), but there was no significant change in the erythrocyte sedimentation rate, the fibrinogen level or the platelet count. There was a significant decrease in the bleeding time from a mean of 360 sec before the laparotomy to a mean of 280 sec after the laparotomy ($p = 0.02$). This hypercoagulability was accompanied in all animals by the development of significantly increased amounts of SC in all vessels tested. The amount of SC was greatest in the inferior vena cava and venous amounts of SC were greater than arterial amounts of SC. Paired arterial and venous bleeding times showed that the decreased amount of SC in the artery was reflected in a longer bleeding time, compared with the venous blood. Microscopic examination of the blood showed large platelet and platelet neutrophil aggregates present after, but the before, the laparotomy. These results suggest that the hypercoagulability that develops following surgical trauma is reflected by the formation of SC, implying that SC can occur in situations other than low flow states and may explain why SC is seen by TEE in trauma patients with normal LV function.

1024-117 Relation between Cardiovascular Risk Factors and Atherosclerotic Plaque of the Thoracic Aorta. A large prospective study using multiplane transesophageal echocardiography

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Thoracic aortic plaque (TAP) plays a major role in development of aortic aneurysms and represents a marker of coronary artery disease (CAD). There is a close association between TAP and systemic embolizations but few data are available on cardiovascular risk factors (RF) and TAP. The aim of this study was to specify the relation between age, sex, RF (hypertension, cigarette smoking, diabetes, family history of CAD, hypercholesterolemia) and TAP. 307 consecutive pts with valvular disease who underwent multiplane transesophageal echocardiography (TEE) and coronary angiography were prospectively included (65 ± 11 years, 64% males). 6 pts with myocardial infarction were excluded. TEE recording was interpreted independently by 2 observers. 128 (41%) pts had TAP on TEE and 198 had one or more RF. Smoking were present in 29%, hypercholesterolemia in 23%, diabetes in 12%, hypertension in 34%, and family history of CAD in 14% (1.1 RF per pt). Pts with TAP were older ($p = 0.0001$), had more CAD ($p = 0.0001$) and more RF: hypercholesterolemia ($p = 0.0001$), smoking ($p = 0.0001$), diabetes ($p = 0.004$), hypertension ($p = 0.009$) and family history ($p = 0.01$). Multivariate stepwise regression analysis of sex, age, RF revealed that age, smoking, sex, diabetes were independent predictors (IP) of TAP and that age, smoking, hypercholesterolemia, sex, diabetes were IP of CAD. This prospective study indicates that age, smoking, sex, diabetes were IP of TAP on TEE in a French population. Because our pts were selected from a group with valvular heart disease, our findings could reflect the situation in a general population.

1024-118 Value of Transthoracic Echocardiography in a Trauma Unit

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Despite its widespread use, the clinical utility of transthoracic echocardiography (ECHO) in patients admitted to a trauma unit has not been established. In a large urban trauma center, we evaluated consecutive echo studies over a two year period to determine clinical usefulness. Six hundred and twelve ECHO's were obtained in 569 patients (pts) between ages 14–90 years (mean ± sd: 48 ± 21 years) (76% males) admitted to the R. Adams Cowley Shock Trauma Center.

The most common designated indications for study were evaluation of left ventricular systolic function or wall motion (n = 207), pericardial effusion (n = 87), contusion (n = 66), and arrhythmias (n = 35). Excellent quality studies were obtained 54% of 147 pts aged ≤ 30 years compared with 29% of 422 pts ≥ 30 years ($p < 0.03$). No useful information was obtained in 9% of 210 pts aged ≥ 60 years compared with 4% of 359 pts < 60 years ($p < 0.02$). Substantial abnormalities were found in 160 (28%) of 569 patients. Management was potentially affected in 212 (37%) of patients. Transesophageal echocardiography was performed in 32 of these patients and affected management in 8.

Despite limitations, especially in older pts, ECHO is often very useful, assisting with clinical decision making in a busy trauma center.